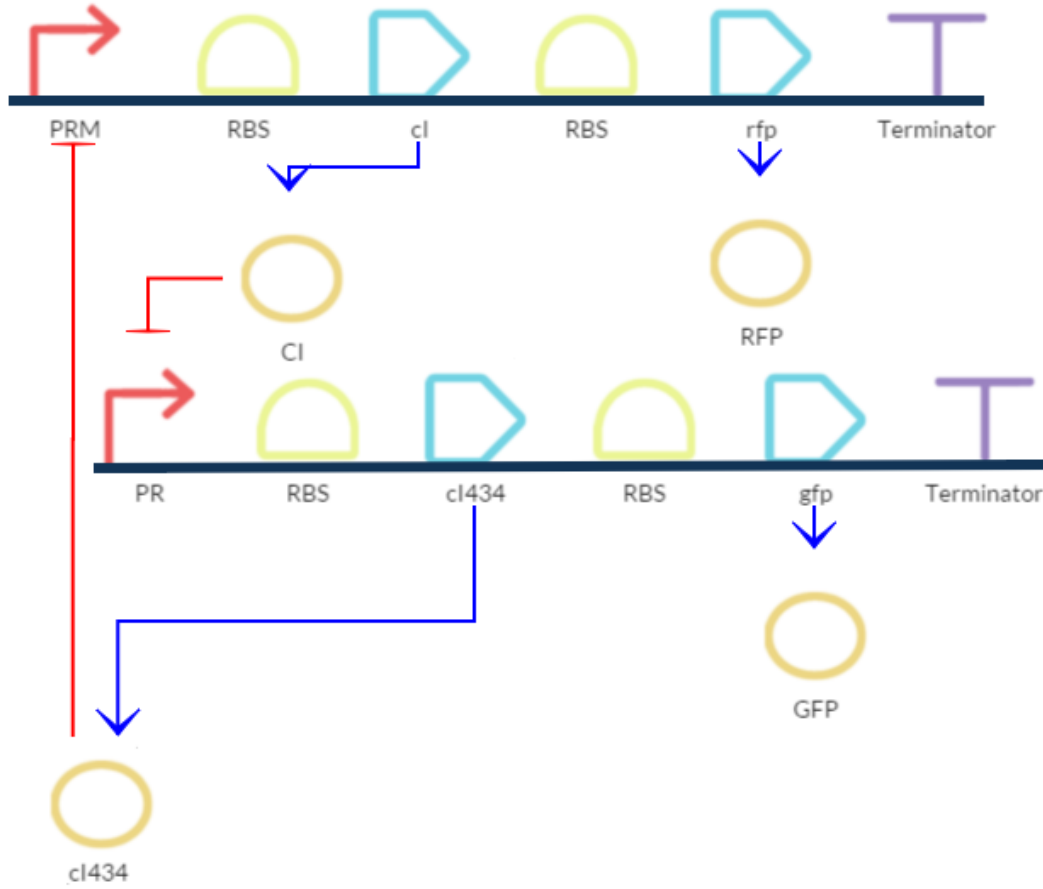


## Toggle switch



### Formulae for two certain parts

CI and cI

$$\frac{d[\text{CI}]}{dt} = k_1 k_2 \chi_{PRM} [\text{cI}^F] - \gamma_1 [\text{CI}]$$

$$[\text{cI}^F] = [\text{cI}] \frac{1}{1 + \left( \frac{[\text{CI434}]}{K_4} \right)^{n_4}}$$

RFP and rfp

$$\frac{d[\text{RFP}]}{dt} = k_8 \chi_{PRM} [\text{rfp}^F] - \gamma_5 [\text{RFP}]$$

$$[\text{rfp}^F] = [\text{rfp}] \frac{1}{1 + \left( \frac{[\text{CI434}]}{K_4} \right)^{n_4}}$$

CI434 and cI434

$$\frac{d[\text{CI434}]}{dt} = k_6 k_7 \chi_{PR} [\text{cI434}^F] - \gamma_4 [\text{CI434}]$$

$$[\text{cI434}^F] = [\text{cI434}] \frac{1}{1 + \left( \frac{[\text{CI}]}{K_3} \right)^{n_3}}$$

GFP and gfp

$$\frac{d[\text{GFP}]}{dt} = k_9 \chi_{PR} [\text{gfp}^F] - \gamma_6 [\text{GFP}]$$

$$[\text{gfp}^F] = [\text{gfp}] \frac{1}{1 + \left( \frac{[\text{CI}]}{K_3} \right)^{n_3}}$$

### Parameter Table

k1	Max transcription rate of regulatory CI mRNA	0.0933 nM/s
k2	translation rate of CI protein	0.0072 /s
K1	Kd of Plux promoter	1.6 nM
K2	Kd between theophylline and RNA aptamer	210nM
k3	max transcription rate of cheZ mRNA	0.0834 nM/s
k4	translation rate of cheZ protein	0.1869 /s
k5	translation rate of lasI protein	0.016 /s
k6	max transcription rate of ci434 mRNA	0.0987 nM/s
k7	translation rate of CI434 protein	0.0845 /s
K3	Kd between ci protein and bistable ci434 promoter	40 nM
K4	Kd between ci434 protein and bistable ci promoter	50nM
k8	Translation rate of RFP protein	0.0457/s assumed
k9	Translation rate of GFP protein	0.0368/s assumed
k10	Translation rate of Colicin E7-1	0.056/s assumed
k11	Translation rate of Lysis1	0.047/s assumed
n1	Hill co-efficiency of Plux promter	1.6
n2	Hill co-efficiency of theophylline and RNA aptamer	3
n3	Hill co-efficiency of ci protein and ci434 promoter	4
n4	Hill co-efficiency of ci434 protein and bistable ci promoter	2
$\gamma_1$	Degradation rate of regulatory CI protein	0.000935 /s
$\gamma_2$	Degradation rate of cheZ protein	0.00434 /s
$\gamma_3$	Degradation rate of lasI protein	0.0001 /s
$\gamma_4$	Degradation rate of CI434 protein	0.000935 /s
$\gamma_5$	Degradation rate of RFP	0.000647/s assumed
$\gamma_6$	Degradation rate of GFP	0.000528/s assumed
$\gamma_7$	Degradation rate of Colicin E71	0.00045/s assumed

$\gamma_8$	Degradation rate of Lysis1	0.00073/s assumed
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**Reference:** <http://2011.igem.org/Team:USTC-China>